

Appl. No.: 010/087,485
Amdt. Dated: February 17, 2004
Reply to Office Action of: November 17, 2003

REMARKS/ARGUMENTS

Claims 15, 18, 19, 27, 29 - 31, 33, 41 - 43, 51 and 52 remain in this application. Claims 15, 18, 19, 27, 29-31, 33, and 41-43 have been amended. Claim 13 has been canceled herein. Claims 1-12, 14, 16-17, 20-26, 28, 32, 34-40, and 44-50 have previously been withdrawn from consideration, without prejudice.

1. Comments on Examiner's "Response to Amendment"

The Question

Was claim 33 was canceled or was there a typographical error canceling claim 33?

Reply

Claim 33 remains in the application. There was a typographical error.

2. Drawings

The Examiner has indicated in the accompanying form PTO-948 that the formal drawings previously submitted have been approved.

3. § 112 Rejections

The Examiner has rejected claims 15, 18, 19, 27, 29, 30, 31, 41 - 43, 51, and 52 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In particular, the Examiner has stated:

"Claims 15 and 30 recite a fluoride excimer laser having a pulse repetition rate $\geq 4\text{kHz}$ for producing a UV wavelength $>200\text{nm}$. The claim reciting the excimer laser chamber including at least one magnesium fluoride crystal optic window for output said $<200\text{nm}$ wavelength and a 42mm crystal."

The Examiner states that the claim is vague and indefinite as to the structure of the 42mm crystal in relations to the magnesium fluoride window; for example, "Where is the crystal located?" and what is the structural significance with relationship to the transmission properties recited as stated in the Office Action.

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The invention is directed to optical elements made from a crystal of magnesium fluoride, for example, prisms and the windows of a laser chamber, and to a laser system having at least one window component made from a crystal of magnesium fluoride and components of such laser system such as a prism or laser chamber window that is made from a crystal of magnesium fluoride. This magnesium fluoride material has certain properties that are enumerated in the amended claims.

In the present Response applicants have amended the claims to clarify that the fluoride crystal is the material that is used to make the window of the laser chamber. In addition, applicants have amended the claims to indicate that the "42mm" refers to the thickness or path length of the element (crystal, window, etc) through which the indicated wavelengths pass when a specific test is carried out. For example, when the absorption as measured at 255nm, the path length is 42mm.

In addition to amending the claims for clarity, applicants have amended the specification in paragraphs [0008], [0014] and [0027] by the addition of a sentence clarifying the statements made elsewhere in these paragraphs and the specification. For example, in paragraph [0008] the sentences of the paragraph have been *restated* in an amendment by addition of a *summarizing sentence* that reads as follows (underlining included):

"... That is: the invention includes a ≥ 4 kHz repetition rate argon fluoride excimer laser system in which the laser chamber has at least one window made from a single crystal of magnesium fluoride, and such window, after exposure to 5 million pulses of 193nm light having a fluence of $40\text{mJ}/\text{cm}^2/\text{pulse}$, has an absorbance of less than 0.08 Abs per 42mm path length when measured at 255nm and a 120nm transmission of at least 30% through a 42mm path."

Applicants believe that the sentence added to paragraph, and the similar amendments to the other paragraphs, does not add new subject matter to the application. Applicants wish to clarify that a 42 mm thick window of MgF_2 was exposed to 5 million pulses of 193nm light of fluence $40\text{mJ}/\text{cm}^2/\text{pulse}$, and that after such exposure the 42mm window had an absorbance of less than for that 42mm path length.

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4. § 103 Rejections

The Examiner has rejected claims 13, 15, 18, 19, 27, 29, 30, 31, 41 - 43, 51, and 52 under 35 U.S.C. §103(a) as being unpatentable for obviousness over Stamm, U.S. Patent No. 6,560,254 or Rebhan, U.S. Publication No. 2001/0043331 in light of Kleinschmidt, et al U.S. Patent No. 6,345,065.

The Examiner asserts that Stamm teaches an ArF or KrF laser producing a 193 or <200nm discharge at a pulse rate of 4kHz or more with optical windows, and that Rebhan teaches a chamber (6) that has windows made of magnesium fluoride or a prism which are transmissive or transparent to UV wavelengths. The Examiner continues that the claims require a 42 mm thick window (*not correct*) and that Kleinschmidt discloses a F₂ excimer laser having a <200nm discharge and the use of a crystal in the gas laser system. Concluding, the Examiner states that it is obvious to provide Stamm or Rebhan with the crystal taught or suggested by Kleinschmidt; that discovering the optimum size of the crystal or workable ranges such as wavelength involves only routine skill. Applicants traverse the rejection.

As applicants' have already stated above, the invention does not require a 42 mm window. The absorption measurement at 255 nm after exposure to 193 radiation was performed *using* a 42 mm magnesium fluoride window. The wording of the claims and specification may have been unclear. Applicants have corrected this by the amendments herein.

Applicants assert that Stamm in view of either Rebhan or Kleinschmidt does not teach the claimed invention. The claimed invention is directed to a laser system that has at least one magnesium fluoride window (claim 15) and a excimer laser magnesium fluoride optic that can be used in a laser system (claim 30), in each case the magnesium fluoride element having an induced adsorption of less than 0.08 Abs per 42mm path length, a 120 nm transmission of at least 30% and a 200-210 absorption coefficient of <0.0017 cm⁻¹ *after exposure to 5 million pulses of 193nm light at a fluence of 40 mJ/cm²/pulse*. In each case the claims are directed to durability after exposure to 193nm radiation. Applicants submit that none of the cited art, either alone or in combination, teaches this durability.

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Stamm teaches a laser system having elements comprised of a material with the characteristics such as the absorption coefficients as stated, for example, in the Abstract. Stamm gives no information regarding the durability of these elements after exposure to laser radiation such as 193nm radiation. The information provided by Stamm seems to pertain to the initial state of the laser materials and not to their state after use. In the absence of such information applicants cannot make a comparison between Stamm and their claimed invention. Any Beer-Lambert Law calculations comparing Stamm and the claimed invention would be meaningless because the comparison would be between two different items, the "fresh" lenses of Stamm and the "aged" lenses (5 million pulses of 40 mJ/cm²/pulse radiation) as disclosed in the present application. Consequently, applicants submit that Stamm does not teach or suggest the present invention.

It is well known in the art that an optical element can "blacken"; that is, the percent light transmission through the element can decrease with use. The causes of blackening can be the presence of impurities in the material of which the element is made or the existence of vacancies in the material as a result of the crystal growth process. The time frame in which the element will be blacked is dependent not only on the concentration of such impurities or vacancies, but also on the fluence of the light. If the element has a high percentage of defects or if high fluence light is used the element will blacken relatively quickly and the system would become useless after much less than the 5 million pulses as described relative to applicant's invention. In the absence of information enabling applicants to make a comparison between Stamm and their claimed invention, applicants submit that Stamm does not teach or suggest the present invention.

With regard to Rebhan and Kleinschmidt, neither of these patents gives information regarding laser optics durability. Consequently, applicants submit that neither of these citations, either alone or in combination with Stamm, bears on the claimed durability of their claimed invention.

Therefore, in view of the foregoing comments and arguments, applicants submit that Stamm, Rebhan and Kleinschmidt, standing alone or in combination, do not teach or suggest the claimed invention, and that the invention as claimed is patentable over the cited art.

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Thus, applicants respectfully submit that it is proper for the Examiner to withdraw the Section 103(a) rejection to the pending claims.

Applicants have also reviewed the art made of record but not relied on the Office Action. This art is Myer (US 6,567,450 or 2002/0044586), Knowles et al (US 2002/0154671), Partlo et al. (US2002/0105994), Kleinschmidt et al (US 6,345,065), Sparrow (US2002/0122450) and 2002/0122451) and Kleinschmidt et al. (US6,421,356). Applicants respectfully submit that none of this art teaches the invention as claimed. Specifically, none of this art teaches the use of magnesium fluoride optics having properties after 5 million pulses of $>40 \text{ mJ/cm}^2/\text{pulse}$ as set forth in the claims.

Applicant believes that no extension of time is necessary to make this Reply timely. Should applicants be in error, applicants respectfully request that the Office grant such time extension pursuant to 37 C.F.R. § 1.136(a) as necessary to make this Reply timely, and hereby authorizes the Office to charge any necessary fee or surcharge with respect to said time extension to the deposit account of the undersigned firm of attorneys, Deposit Account 03-3325.

Please direct any questions or comments to Walter M. Douglas at (607) 974-2431.

17 February 2004
Date

CERTIFICATE OF TRANSMISSION UNDER 37 C.F.R. § 1.136	
I hereby certify that this paper and any papers referred to herein are being transmitted by facsimile to the U.S. Patent and Trademark Office at 703-872-9318 on:	
<u>17 February 2004</u>	Date
<u>Walter M. Douglas</u>	<u>17 Feb 2004</u>
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Respectfully submitted,
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